Complex & Intelligent Systems (2021) 7:1709–1710
https://doi.org/10.1007/s40747-021-00468-w

EDITORIAL

Editorial on "Cognitive Computing for Human–Robot Interaction"

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Published online: 27 July 2021

Introduction

Cognitive computing technologies that mimic the functioning of the human brain have numerous applications across various fields and are now being increasingly integrated into the field of human–robot interaction. It enables the robots to interact with humans while doing a task, adjust and adapt themselves to the changing signals. If implemented appropriately, cognitive computing will possibly make a new generation of advancements in human–robot interaction that assist humans with advanced features and functionalities. In short, robots can see, speak, listen, navigate, control, and manipulate in the same way as the human does. However, research in this background is still in an earlier stage and needs in-depth explorations.

This special issue entitled "Cognitive Computing for Human–Robot Interaction" explores advanced research in this background that ultimately enables society to take advantage of every aspect of robotics and sustainable computing applications. This special includes a series of 13 articles that discuss cognitive computing abilities, working implementations, new and innovative frameworks and architectures. Supported by the experimental results, this special issue explores more explicit knowledge on pervasive and human-level semantics and interaction with robotics for sustainable computing applications.

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Cognitive computing for human–robot interaction

In the first article, "Improving ant colony optimization algorithm with epsilon greedy and Levy flight," the authors have proposed a methodology using epsilon greedy and levy flight to improve the functionalities of ant colony optimization algorithms. The key objective here is to improve the performance of ant colony optimization algorithms across various real-time applications. The experimental results show comparatively better performance than the existing approaches, and it greatly assists the efficient use of ant colony algorithms to optimize human–machine interaction. In the second article, "Concurrent service access and management framework for user-centric future internet of things in smart cities," the authors highlight the importance of efficiently managing user-centered interactions across smart environments. This work introduces a concurrent service and access management framework to obtain the goals of reliable services and interoperability features. In the third article, "A group-key-based sensitive attribute protection in cloud storage using modified random Fibonacci cryptography," the authors attempt to resolve security constraints associated with various aspects of human–machine interactions. They have effectively implemented a group-key based sensitive attribute protection algorithm to achieve the intended goals of security and privacy issues.

In the fourth article, "Speaker recognition based on characteristic spectrograms and an improved self-organizing feature map neural network," the authors present the most interesting approach to speaker recognition using neural networks algorithms. This approach greatly helps in the efficient understanding of speaker pronunciation of words and incorporates self-organization features across human–robot interaction. An adaptive clustering self-organizing feature map SOM (AC-SOM) is proposed, and it provides the most promising solutions to human speech recognition and robotic interaction. In the fifth article, "Recognition and location of typical automotive parts based on the RGB-D camera," the authors try to solve the problem of multi-part

automatic assembly line sorting in machine vision with innovative solutions. The experimental results show that the visual positioning effects are more convincing and provide satisfactory results. In the sixth article, "An ontology enabled internet of things framework in intelligent agriculture for preventing post-harvest losses," the authors aim to focus on the application of human–robot interaction across the agricultural sector. The cognitive approach used in this work greatly enhances agricultural productivity as well as the robotics application in agricultural streams.

In the seventh article, "A novel entropy-based weighted attribute selection in enhanced multicriteria decision-making using fuzzy TOPSIS model for hesitant fuzzy rough environment," the authors present a multicriteria decision-making framework for human–robot interaction. It works on the basis of entropy-based weighted attribute selection. Fuzzy concepts are used with complex and unclear inputs. In the eighth article, "Adsorption control of a pipeline robot based on improved PSO algorithm," the authors present a "particle swarm optimization" method to deal with motion control in mobile robots. The experimental observation indicates better results, especially with the circular navigation. In the ninth article, "Machine learning model-based two-dimensional matrix computation model for human motion and dance recovery," the authors present a machine learning-assisted two-dimensional computational matrix model for human movement capturing and control. The major advantage here is that this method works well with short-term recovery problems.

In the tenth article, "Evaluation of cloud computing resource scheduling based on an improved optimization algorithm," the authors present efficient scheduling algorithms to optimize the performance of complex applications. This method greatly improves the quality of service. In the paper, "Compliance and application tests of usability guidelines about giving information quickly and comprehensively," the authors present a comprehensive approach using cognitive computing technologies for faster and efficient human–robot interaction processes. This approach works well with appropriate training models. In the article, "Cross corpus multilingual speech emotion recognition using ensemble learning," the authors make an attempt to incorporate emotion recognition factors across human–robot interaction. A cross corpus method is used for multilingual speech and emotion recognition between human and robots. Finally, in the last article, "Hand gesture classification using a novel CNN-crow search algorithm," the authors present a novel CNN approach for gesture and motion recognition and classification. It works on the basis of the CNN-crow search algorithm. The results are found to be comparatively satisfactory with better accuracy.

Conclusion

This special issue attempted to bring the significance of cognitive computing for various aspects of human–robot interaction. The response from the research community is significant, and the qualitative articles that meet the standards of the journal are selected for publication after a double-blinded peer-review process. In closing, we would like to thank all the reviewers and authors for their timely contributions. We convey our gratitude to the Editor-in-Chief of the journal for offering us the privilege to edit this special issue.